National Heart Attack Alert Program

Educational Strategies To Prevent Prehospital Delay in Patients at High Risk for Acute Myocardial Infarction

NATIONAL INSTITUTES OF HEALTH
NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

Educational Strategies To Prevent Prehospital Delay in Patients at High Risk for Acute Myocardial Infarction

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National Heart Attack Alert Program Coordinating Committee

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ABSTRACT

An estimated 13 million people in the United States have coronary heart disease (CHD), peripheral vascular disease, or cerebrovascular disease. The risk for subsequent myocardial infarction (MI) and death in these patients is fivefold to sevenfold higher than for the general population. Many effective therapies are now available for patients with unstable angina, acute myocardial infarction (AMI), potentially fatal arrhythmias, and cardiogenic shock, if they seek and receive care expeditiously. However, delays in accessing and receiving care are a continuing problem, threatening the effectiveness of available treatments. Patients with previously diagnosed CHD, including a previous MI, have the same or greater delay times as those without prior MI or CHD. Because of the high-risk status of these patients, combined with the problem of delay in seeking care, this Working Group of the National Heart Attack Alert Program Coordinating Committee advises physicians and other health care providers of their important role in reducing treatment delay in these patients. The Working Group recommends that primary care clinicians in the office and in inpatient settings provide these patients and their family members or significant others with contingency counseling about actions to take in response to symptoms of an AMI. The counseling should address the emotional aspects (e.g., fear and denial) that patients and those around them may experience, as well as barriers that may be associated with the health care delivery system. Assistance from other health care providers (e.g., nurses) should be solicited to initiate, reinforce, and supplement the counseling. A Patient Advisory Form is offered as an aid to providers in counseling their high-risk patients about these issues. Other materials and aids should be considered as well. Physicians' offices and clinics should devise a system to triage patients rapidly when they call or walk in seeking advice for possible AMI symptoms. Further research is needed to learn more about effective counseling strategies, symptom manifestation in high-risk groups including the elderly, women, and minorities, and health care delivery systems that enhance access to timely care for patients with prior CHD or other clinical atherosclerotic disease.

INTRODUCTION

The National Heart, Lung, and Blood Institute established the National Heart Attack Alert Program (NHAAP) with the goal of reducing morbidity and mortality rates for patients with acute myocardial infarction (AMI), including those with sudden cardiac death. One of the objectives of the program is to encourage physicians and other health care providers to educate their high-risk patients to seek immediate medical care when they experience symptoms suggestive of AMI or ischemia. A dramatic reduction in mortality has been demonstrated with *early* administration of thrombolytic therapy for AMI, an effect that has been documented in multiple, large, randomized clinical trials.[1-5] The consistent findings emphasize the major advantage of administration of thrombolytic drugs at the onset of symptoms of AMI accompanied by ST elevation. All studies have shown a time-dependent benefit of thrombolytic therapy. In many patients, administration of thrombolytic drugs within 1 hour of symptom onset results in little or no evidence of myocardial damage.[6-9] The Thrombolysis in Myocardial Infarction (TIMI) phase II trial found that for each hour earlier a patient was treated with thrombolytic therapy, there was a decrease in absolute mortality of 1 percent. This translates to approximately 10 lives saved for every 1,000 patients treated.[10] An effect of time to treatment also has been observed in patients treated with primary angioplasty,[11] although more data are needed. Multiple effective interventions, including primary angioplasty, can be made available for early management of AMI, unstable angina, potentially fatal arrhythmias, and cardiogenic shock, if patients and their families seek and receive care expeditiously.

Unfortunately, not all AMI patients receive the benefits of these dramatic advances in treatment. Recent data from a national registry of over 240,000 AMI patients revealed that only 35 percent of patients with a discharge diagnosis of AMI were treated with thrombolytic therapy.[12] Data from the National Registry of Myocardial Infarction[12] and from the TIMI 9 Registry[13] indicate that those who do not receive a thrombolytic agent were also not treated aggressively with other drugs such as aspirin, beta blockers, and heparin, all shown to be effective in reducing AMI morbidity and mortality. Arrival at the hospital more than 6 hours after symptom onset and lack of ST-segment elevation are frequently cited reasons for not administering a thrombolytic drug.[13-17]

Studies document that the most common reason for treatment delay is the patient not seeking care promptly.[18] The median time delay in seeking care after the onset of symptoms of AMI ranges from 2 to 6.4 hours.[19] The median time delay to treatment in the National Registry of Myocardial Infarction was 2.2 hours.[12] Despite the potential benefit of early treatment, few patients are treated within the first 60 to 90 minutes. For example, only 3 percent of patients in the Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries (GUSTO) trial,[20] 3 percent in the TIMI phase II trial,[21] and 10.9 percent in the Gruppo Italiano per lo Studio della Streptochinasi nell' Infarto Miocardico (GISSI) I trial[1] were treated within the first hour of symptom onset.

The primary objective of this report is to alert physicians and other primary care providers to their vital role in reducing morbidity and mortality from AMI in patients who have known cardiovascular disease and to suggest strategies useful in reducing patient delay. Data are lacking about what information is communicated to these patients regarding recognition and response to future acute ischemic events, which health care providers typically do the counseling, how often counseling is done, and the settings where counseling occurs. However, since health care providers frequently interact with patients at high risk for AMI and their families, they have the opportunity to provide counseling and other interventions to improve the patients' understanding of early symptoms of AMI and the need for and benefits of prompt evaluation and treatment. The important role of physicians in influencing patient behavior has been well documented.[22] Physicians also should elicit the counseling skills of nurses and other health care providers to complement and supplement their advice to patients and families.

This paper, based on the work of an NHAAP working group, describes (1) the high-risk patient population that providers should target for intervention, (2) predictors of patient delay, (3) issues of barriers and access to care, (4) recommendations for high-risk patient education about early recognition and response to AMI symptoms, (5) economic and legal issues surrounding early treatment, and (6) recommendations for research and practice.

Educational Strategies To Prevent Prehospital Delay in Patients at High Risk for Acute Myocardial Infarction

Rationale for Targeting a High-risk Group

Ideally, education regarding the symptoms and signs of AMI and the need to seek treatment promptly should be directed to all individuals, which is a long-term goal of the NHAAP. However, in order to focus resources on patients who are most likely to need the information, educational and counseling interventions should be aimed at reducing patient delay for those individuals who are at high risk for a future AMI. Based on health interviews conducted in 1994, approximately 8 million Americans have coronary heart disease (CHD), about 3 million have cerebrovascular disease, and about 2 million have peripheral vascular disease.[23] Patients with established CHD or clinical atherosclerotic disease of the aorta, peripheral arteries, or carotid arteries are at high risk for subsequent myocardial infarction (MI) or CHD death.[24-26] About 50 percent of all MIs and at least 70 percent of CHD deaths occur in individuals with prior manifestations of cardiovascular disease.[27,28] The risk for subsequent MI and death in patients with established CHD (or other atherosclerotic disease) is fivefold to sevenfold higher than for the general population.[24]

Predictors of Prehospital Delay

Researchers have identified sociodemographic factors, clinical characteristics, and patient/bystander behaviors associated with long prehospital delay times in seeking care for an AMI (Table 1). These findings can assist clinicians in identifying patients likely to delay and guide strategies that might be effective in reducing delay.

Table 1

Factors Affecting Prehospital Delay in Patients With Symptoms and Signs of Acute Myocardial Infarction

Factors Contributing to Increased Delay	Factors Contributing to Decreased Delay
Older age	Hemodynamic instability
Female gender	Large infarct size
African-American race	Sudden onset of severe chest pain
Low socioeconomic status	Recognition by patient that symptoms are heart-related
Low emotional or somatic awareness	Consulting a friend, coworker, or stranger
History of angina, diabetes, or both	
Consulting a spouse or other relative	
Consulting a physician	
Self-treatment	

Certain sociodemographic characteristics, including older age[17,29-34] and female gender,[30,33,35-38] are associated with increased delay times in care-seeking for AMI. Ethnicity/race have not been studied adequately. The majority of studies have involved Caucasian patients, but the few studies conducted focusing on ethnic and racial groups indicate delays in care-seeking may be considerably greater in African-Americans.[35,36,39] For example, Clark and colleagues[36] found African-Americans living in the inner city delayed an average of 11.9 hours before seeking medical treatment in a hospital emergency department. Delays also appear to increase with low socioeconomic status,[40,41] although this is not a consistent finding.[42]

Several clinical characteristics also affect delay time. Severe chest pain is associated with reduced delay times but only if it is sudden in onset[35,38] or accompanied by hemodynamic instability.[29,33] Patients with severe chest pain of gradual onset do not respond quicker than patients with less severe pain, possibly because they accommodate to the pain's gradual onset.[29,43] Similarly, patients with a history of anginal pain or diabetes are more likely to delay than patients without these conditions.[30,33,44-46] A striking finding across all studies is that patients already diagnosed with CHD, heart failure, or previous MI have the same or greater delay times as those without prior MI or CHD.[17,19] The fact that patients know they have heart disease, or have experienced a previous AMI, does not appear to translate to quicker action. This emphasizes the need to focus attention on this high-risk group.

Since identification of social, demographic, or clinical characteristics alone does not explain the reasons why people delay, some investigators have explored the relationship between selected personality characteristics and delay, although definitive conclusions cannot yet be drawn. Kenyon and colleagues[47] reported that patients with low awareness of or sensitivity to emotions or bodily sensations were at risk for extremely long delays compared with those patients who were more capable of identifying their emotions or sensations. Studies of the effects of Type A/Type B personality on delay present inconsistent findings.[48,49]

Finally, the role of physicians and other health care providers, family members/significant others, and friends in helping patients make decisions to come to an emergency department is an important determinant of patient delay. The majority of patients consult someone, either a layperson or a physician, prior to calling 9-1-1 or taking other transportation to the hospital.[35,50] If patients call a physician, delay times are significantly increased.[35,45,46,51,52] Physicians and other health care providers may not be readily available at the time of the call. Office staff or telephone services try to reach them or give advice and assurance, thereby increasing delay. If patients consult a friend, coworker, or stranger, they come to the emergency department more quickly than if they consult a family member/significant other.[35,53]

Barriers and Access Issues

Access to care facilitates, and barriers to care impede, timely presentation by patients with known CHD whose symptoms suggest AMI. Access to care can be viewed across the five dimensions described by Penchansky and Thomas:[54] availability, accessibility, accommodation, affordability, and acceptability. Educational messages for patients experiencing symptoms of AMI should address these five dimensions. Whenever possible, physicians and other health care providers should identify an individual patient's health care system barriers and personalize the educational information.

Availability

Fundamental to access to care is the presence of appropriate diagnostic and therapeutic services at a nearby hospital. These services include 24-hour emergency departments with equipment and trained personnel. Most hospitals do not have cardiac catheterization facilities, but these hospitals

can care for acute CHD patients if well-specified consultation and referral arrangements have been made with more extensively equipped and staffed facilities.[55]

Although most hospitals can provide the appropriate therapy, the time delay between initial presentation and treatment, particularly the delay until initiation of thrombolytic therapy, represents an area for continuous quality improvement efforts by many hospitals.[9] Rural areas served by small hospitals may face particular difficulties in providing the necessary services because the personnel trained to make a rapid diagnosis of AMI and initiate emergency treatment, including thrombolytic therapy, may not be as readily available.[56]

Accessibility

An emergency medical services (EMS) system that responds quickly and effectively to stabilize and transport the patient to the emergency department is crucial. Regardless of EMS system design, all communities should have adequate EMS coverage with advanced life support (ALS)-trained personnel and ALS-equipped vehicles to ensure a rapid response to all priority emergency calls. However, EMS systems across the United States are heterogeneous, and responsibility for ensuring standardization is variable.[57]

There are potential barriers to rapid care of cardiac patients created by the insurer. Health maintenance organizations (HMOs) and other managed care provider organizations strive to decrease inappropriate uses of medical resources through, for example, the use of gatekeepers and primary care physicians (rather than specialists). However, there is the potential for these requirements to become barriers that delay care of the acute cardiac patient when rapid care is appropriate. Health care payers must strive to minimize or prevent delays when rapid care is needed. Use of 9-1-1 and prehospital emergency medical services is a proper usage of resources when a patient has a suspected acute coronary syndrome (e.g., chest pain, marked dyspnea, diaphoresis, cardiac arrest). Health care payers or insurers need to develop their plans and protocols carefully to ensure rapid access for the acute cardiac patient.

Other barriers to access are those associated with low socioeconomic status and lack of health insurance. Low-income and minority patients (two groups with substantial overlap) have a disproportionate share of both CHD prevalence and poor outcomes of CHD events.[58,59] It is often hypothesized that access problems may contribute to this finding.[60,61] Lack of telephone and transportation services may be factors.[40,62] However, some of the greater delay time among minority patients appears to be related to other factors. The greater percentage of CHD deaths occurring out of hospital in blacks versus whites may relate to patient behavior, access to or use of the EMS system, or variations in disease manifestations or treatment.[63]

Accommodation

Accommodation refers to patients' perception of the responsiveness of the health care system to their symptoms. An important issue related to accommodation in the changing health care system is restriction of emergency department use by third-party payers. The high unit costs of emergency department visits and the rate of inappropriate use of the emergency department for nonemergent care, such as colds and minor injuries, make these services priorities for cost control in health plans. Cost controls may be implemented by requiring patients to contact either their primary care physician or an authorization service telephone number before proceeding to the emergency department.[64] This is a concern for patients with a possible AMI because contacting a personal physician can more than double the delay in receiving appropriate emergency department care for AMI.[19,57,65,66] In the face of persistent symptoms, AMI patients should seek care in the emergency department, not seek advice from physicians or other health care personnel. Contacting medical care personnel other than EMS is a deterrent to rapid care.[67,68] It is

unlikely that a health plan would deny emergency department authorization to a patient with known CHD or other atherosclerotic disease, who has acute ischemic symptoms. However, delays introduced by prior authorization requirements potentially may be great enough to reduce the number of patients potentially eligible for thrombolysis.

Third-party payers, HMOs, and other managed care organizations must continue to allow CHD patients with symptoms of AMI to call EMS rather than a physician or an individual functioning as a gatekeeper. Almost all HMOs and other managed care organizations have written policies distinguishing between life-threatening and non-life-threatening emergencies and waive prior authorization for life-threatening conditions.[69] However, the definition of "life-threatening" may not be clear to patients, and the potential exists that the implementation of the policy may be weighted toward denying reimbursement to patients who seek care for cardiac symptoms for whom AMI is subsequently ruled out. HMO patients with preexisting cardiovascular disease who are acutely symptomatic should be permitted to access emergency departments directly and should be explicitly informed of this access option. Additional research is needed to document health care insurer variables that are associated with increased or decreased patient delays in accessing and obtaining timely care for patients with symptoms and signs of an AMI.

Affordability

Affordability is a concern for all patients but especially for low-income patients who cannot pay out of pocket and are more likely to be uninsured or underinsured.[70] Affordability appears to be a major barrier to receipt of primary care and preventive services,[71] possibly contributing to the greater burden of CHD among low-income patients.[40,58]

Acceptability

Poor acceptability of health care services is a concern particularly for minority patients. Hospital and emergency department facilities available to urban minority populations are often inadequate or unpleasant. Long waiting times may be a major deterrent to seeking care.[72] Also, cultural and linguistic differences between minority patients (especially Hispanic immigrant and Native American populations) and health care providers and institutions may reduce the acceptability of providers to such patients. These barriers may cause patients to delay seeking care from providers to whom they do not relate well and reduce the effectiveness of those providers in educating patients at high risk.[61] Similarly, language differences may make patients who do not speak English hesitant to seek care when they have acute symptoms.

Recommendations for High-Risk Patient Education

Physicians and other health care providers preparing to educate their high-risk patients will need to consider whom to educate, what to tell them, when and where to deliver the information, and how best to present the message about early recognition and response to AMI symptoms. All instructions should be entered in the patient's record so other members of the health care team can reinforce them during future visits.

Whom To Educate

Providers should focus their educational efforts on patients with established CHD or clinical atherosclerotic disease of the aorta, arteries to the limbs, or the carotid arteries. Patients with established CHD include patients with definite clinical or laboratory evidence of MI or ischemia or history of coronary artery bypass surgery, coronary angioplasty, or related procedures. In addition, patients with peripheral arterial disease (e.g., patients with an abdominal aortic aneurysm or clinical signs and symptoms of ischemia to the extremities) should be targeted. Substantial carotid atherosclerosis is documented by cerebral symptoms (e.g., patients with transient ischemic attacks or stroke) and demonstration of significant atherosclerosis on ultrasound or angiogram.[73]

Patient Advisory Form
Instructions for Use

Background: This form is designed to be used by physicians and other health care providers to teach high-risk patients about heart attack symptoms and appropriate steps for rapid action. "High-risk" patients are defined as individuals with existing or "known" cardiovascular disease. This includes patients with known coronary heart disease, or clinical atherosclerotic disease of the aorta, peripheral arteries, or carotid arteries. This group of patients has a 5 to 7 times greater risk of subsequent myocardial infarction and sudden death than the general population.

Note about use: This form is not copyrighted. You may duplicate as many copies as you need.

Instructions: Go over the form with your high-risk patients, filling in the blanks so that it is tailored for them.

As you review the form with your patients, you may also wish to address the emotional and social barriers that may contribute to patient delay in the event of a heart attack. These include:

- the tendency to attribute heart attack symptoms to less serious, noncardiac causes (e.g., indigestion)
- the tendency to wait to see if symptoms will go away
- the tendency to self-medicate (e.g., to take an antacid)
- the tendency to seek advice from family, friends, and coworkers
- the tendency to call one's physician
- a reluctance to use the emergency medical services system

Advise your patients that, in the event of heart attack symptoms, they should wait no longer than 15 minutes before calling the emergency medical services system (9-1-1 in most cases). The reward of acting quickly and getting definitive treatment before irreversible myocardial damage occurs should be underscored.

Suggest that your patients keep the completed form on their refrigerator or with their other emergency numbers, as well as keep a copy at work.

Keep a copy of the completed form in your patients' medical records so it can be reinforced by other health care providers at future visits.

Reference: Dracup et al. Working Group on Educational Strategies to Prevent Prehospital Delay in Patients at High Risk for Acute Myocardial Infarction. The physician's role in minimizing prehospital delay in patients at high risk for acute myocardial infarction: Recommendations from the National Heart Attack Alert Program. Ann Intern Med 1997; 126: 645-651.

The National Heart Attack Alert Program welcomes your feedback on the effectiveness of this tool and suggestions for improving it. Comments may be sent to the NHAAP Coordinator at 301-402-1051 (fax) or the address below:

NATIONAL HEART ATTACK ALERT PROGRAM

NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

NHLBI Information Center
P.O. Box 30105
Bethesda, MD 20824-0105
(301) 251-1222

Remove from booklet and seperate at perforation

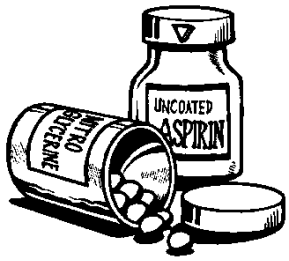
What To Do If You Have One or More Heart Attack Warning Signs

Patient's Name: _____

Physicians now have treatments that can stop heart attacks and lessen damage to the heart. To make sure you can benefit from these treatments, you need to act promptly if you begin to experience symptoms that might signal a heart attack.

1. This is what you may feel:

- Chest pain, discomfort, or pressure
- Left arm pain or discomfort
- Pain radiating to your neck or jaw
- Shortness of breath
- Sweating
- Upset stomach
- Discomfort in the area between your breastbone and navel
- A sense of dread
- Other: _____



2. Medication instructions:

- Chew one 325 mg tablet of uncoated adult aspirin.
- Place one tablet of nitroglycerin under your tongue as soon as you feel discomfort. Take a second tablet if the discomfort does not go away in 5 minutes. Take a third tablet after 5 more minutes if the discomfort does not go away.
- Other: _____

3. If the symptoms stop, call your physician at: _____

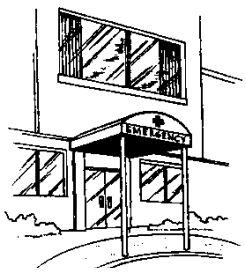
4. If symptoms continue for more than 15 minutes, call the emergency medical services phone number below immediately. (Often this is 9-1-1, but you should check to make sure.) Never wait longer than 15 minutes.

At home, the emergency phone number is: _____

At work, the emergency phone number is: _____

At _____, the emergency phone number is:

_____



5. Know the location of the nearest 24-hour emergency department.

At home, the closest emergency department is: _____

At work, the closest emergency department is: _____

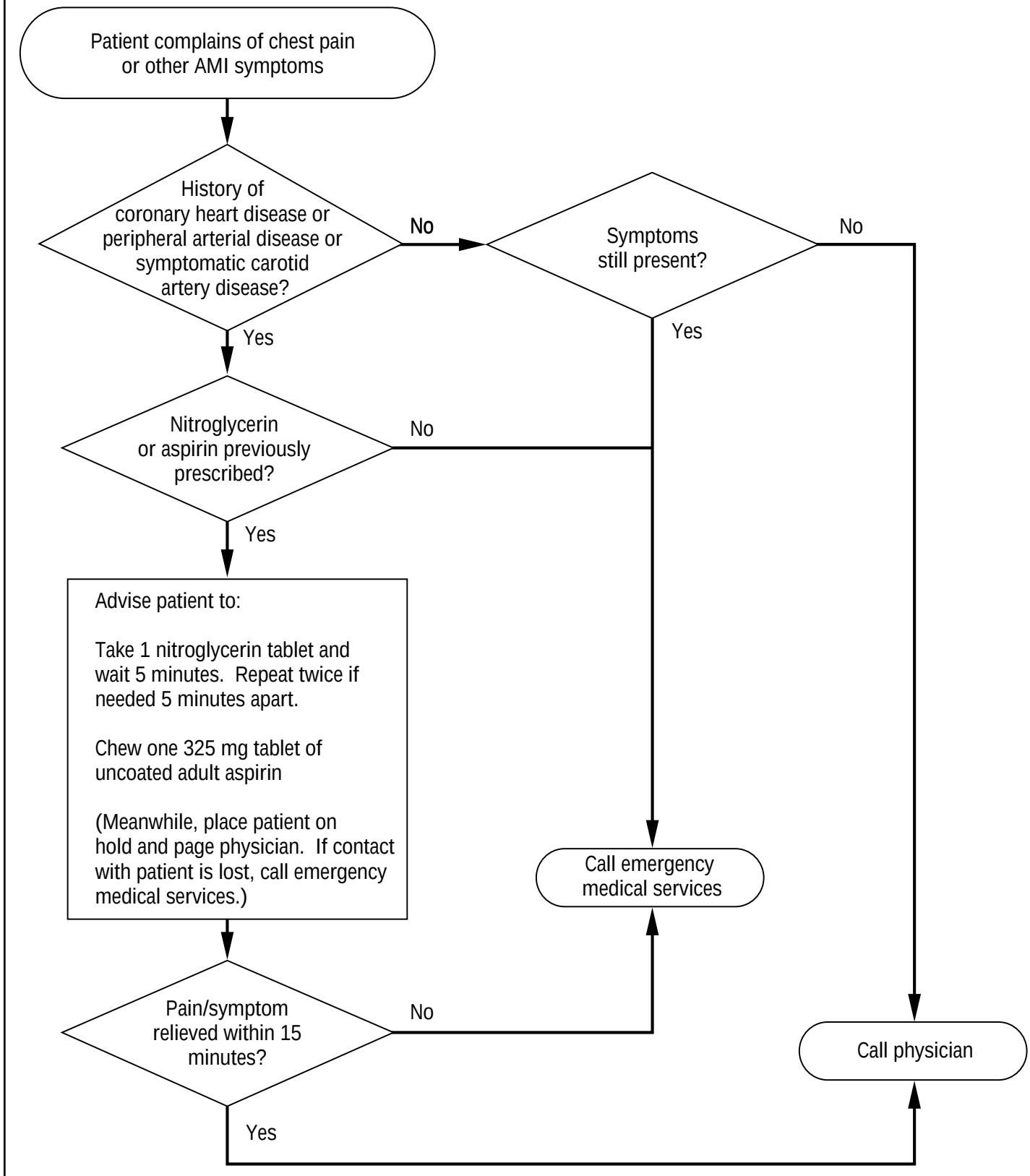
At _____, the closest emergency department is:

_____

Place this form next to the phone, near your other emergency numbers!

Signed: _____ M.D./ R.N.

Office Telephone Triage Algorithm



Telephone Triage Algorithm Instructions for Use

Background: This algorithm is designed to be used by physicians as a template for an office protocol for answering telephone calls (or receiving walk-ins) from patients complaining of chest pain or other possible heart attack symptoms.

Note about use: This algorithm is not copyrighted. You may duplicate as many copies as you need.

Instructions: All office staff members (particularly receptionists or others with whom the patient is likely to have initial contact) should be provided with a checklist of heart attack symptoms and advised about the need for rapid, appropriate action.

Practitioners should provide staff with clear instructions and training about actions to take when a patient with heart attack symptoms calls or walks into the office seeking advice. It is critical that precious time is not wasted while the staff member tries to contact a physician who is temporarily unavailable. If the physician is not immediately available, staff should connect the patient directly to the emergency medical services system (9-1-1 in most locations) if the office telephone system has this capability or staff should instruct the patient (or a family member or friend with the patient) to call the emergency medical services system.

A continuous quality improvement approach should be part of any office/clinic-based triage system (e.g., with a log sheet for calls about chest pain). These data should be reviewed on a regular basis, modifications made to the procedures when the data so indicate, and the system again reevaluated.

Remove from booklet and separate at perforation.

The National Heart Attack Alert Program welcomes your feedback on the effectiveness of this tool and suggestions for improving it. Comments may be sent to the NHAAP Coordinator at 301-402-1051 (fax) or the address below:

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Finally, those patients who are likely to delay should be particularly targeted. These are the elderly,[17,29-34] women,[30,33,35-38] minorities,[35,36,39] those of low socioeconomic status,[40,41] as well as patients with a history of angina or diabetes,[30,33,44-46] and patients with known CHD including heart failure or prior MI.[17,19]

What To Tell High-Risk Patients

The educational message providers must convey to patients includes three essential components: information, emotional issues, and social factors. Patients should be given *information* about the typical symptoms of AMI and the actions to take if they experience those symptoms.

Although the presentation of AMI can be atypical,[74,75] the majority of patients will present with chest pain/discomfort, left arm pain/heaviness, shortness of breath, or a feeling of dread.[76] The differences in presentation profiles, if any, between patients with a CHD history and those presenting for the first time are not well delineated. An analysis of 1,027 patients with a confirmed MI and a history of angina or previous MI, from the Myocardial Infarction Triage and Intervention (MITI) Trial for the year 1992, revealed that patients presented with one or more of the following symptoms: chest pain that may have radiated to the arm, neck, or jaw, 90 percent; dyspnea, 47 percent; diaphoresis, 45 percent; nausea, 34 percent; congestive heart failure, 22 percent; epigastric discomfort/complaints, 9 percent; syncope, 4 percent; cardiac arrest, 4 percent; shock, 1 percent; and coma, 0.29 percent (Table 2). A slightly lower percentage of women in this group presented with diaphoresis and chest pain compared with men. A greater percentage of women presented with symptoms of congestive heart failure, nausea, and to a lesser extent, dyspnea (King County, Washington, 1995, unpublished data).

Table 2

KING COUNTY PATIENTS WITH CONFIRMED MYOCARDIAL INFARCTION* AND HISTORY OF CORONARY HEART DISEASE‡: SYMPTOMS† BY PERCENT PRESENTING

	Percent		
Symptoms	All (n=1,027)	Males (n=683)	Females (n=344)
Chest pain	90	91	89
Dyspnea	47	46	49
Diaphoresis	45	46	42
Nausea	34	32	39
Congestive heart failure	22	18	29
Epigastric	9	9	8
Syncope	4	4	5
Cardiac arrest	4	4	5
Shock	1	1	1
Coma	0.29	0.29	0.29

* All cases

‡ History of angina or MI

† Combined

Source: King County, Washington, 1995, unpublished data

Providers should keep in mind that presenting symptoms of AMI in the elderly may be vague. Older patients more often have a history of hypertension, congestive heart failure, and MI, as well as longer delay times, than younger patients. Among 1,848 patients over 65 years of age from the MITI Trial, a higher proportion of these elderly individuals had no chest pain when first evaluated in the hospital, and fewer elderly patients had ST elevation on the initial electrocardiogram.[34]

Clark et al.[36] found that minority patients have lower levels of symptom recognition and belief in treatability. And according to Raczynski et al.,[77] African-American inpatients admitted for CHD reported fewer painful symptoms and were more likely to attribute symptoms to noncardiac origins (e.g., gastrointestinal tract).

Since many patients believe that an AMI is accompanied by sudden, crushing chest pain and unconsciousness,[78] patients should be told that the symptoms may come on gradually or may be intermittent. The educational message should be adapted to an individual patient's history of symptom presentation; for example, the physician can emphasize jaw discomfort if this symptom occurred in the past as part of the patient's ischemic presentation. However, all of the more frequent presenting symptoms should be addressed since a second heart attack may not manifest itself exactly the same way as the first (something patients should also be told, even though this has not been well studied).

Patients must be clear about the actions they should take if AMI symptoms occur, including taking nitroglycerin (if prescribed), taking aspirin, and calling EMS. Advice about medications should be tailored to the needs of individual patients. The guideline for the use of nitrates for anginal pain published by the Agency for Health Care Policy and Research Guideline Panel[79] appears sound. Patients are directed to take one nitroglycerin tablet as soon as they feel discomfort, take a second tablet if the discomfort does not go away in 5 minutes, and take a third tablet after 5 more minutes if symptoms persist. If the medication does not relieve the discomfort in 15 minutes, they should go to the hospital immediately by activating EMS. Because of aspirin's demonstrated benefit in the case of an acute ischemic event,[3] patients should additionally be advised to chew an adult-strength (325 mg), noncoated aspirin tablet when symptoms present.

Activation of EMS shortens delay for almost all patients with suspected AMI;[80] therefore, high-risk patients and their families should be told to call 9-1-1 or their seven-digit emergency number when a patient has symptoms suggestive of AMI. If a patient lives in a rural area or is a long distance from the nearest hospital, the health care provider should discuss the merits of alternative plans. Having a family member or friend drive is not recommended because the person driving the patient cannot render any patient care and usually cannot communicate with the hospital while en route. Patients should never drive themselves due to the potential of cardiac arrest. Arrival at the emergency department by private vehicle has been shown to delay triage and assessment of AMI patients compared with patients conveyed by EMS.[81] For the AMI patient, prehospital identification by history or electrocardiogram has been shown to decrease time to treatment in the emergency department.[8,67]

A sample form for presenting patient information is presented in Figure 1. It can be individualized by physicians and other health care providers to include any unusual symptoms a patient may experience suggesting an evolving AMI, instructions for any special medications such as nitrates or aspirin that the patient may need, the EMS phone number in the community, and the location of the hospital with 24-hour emergency department service closest to the patient's home and work. Physicians and other health care providers can suggest that patients keep the form on their refrigerators or with their other emergency numbers, as well as keep a copy at work. The selected message regarding expected symptoms and recommended action steps should also

Figure 1

PATIENT ADVISORY FORM

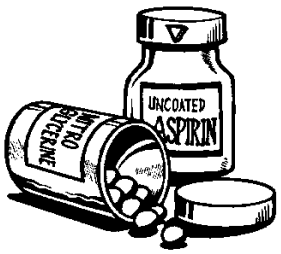
What To Do If You Think You Are Having a Heart Attack

Patient's Name: _____

Physicians now have treatments that can stop heart attacks and lessen damage to the heart. To make sure you can benefit from these treatments, you need to act promptly if you begin to experience symptoms that might signal a heart attack.

1. This is what you may feel:

- Chest pain, discomfort, or pressure
- Left arm pain or discomfort
- Pain radiating to your neck or jaw
- Shortness of breath
- Sweating
- Upset stomach
- Discomfort in the area between your breastbone and navel
- A sense of dread
- Other: _____



2. Medication instructions:

- Chew one 325 mg tablet of uncoated adult aspirin.
- Place one tablet of nitroglycerin under your tongue as soon as you feel discomfort. Take a second tablet if the discomfort does not go away in 5 minutes. Take a third tablet after 5 more minutes if the discomfort does not go away.
- Other: _____

3. If the symptoms stop, call your physician at: _____

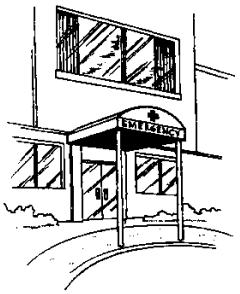
4. If symptoms continue for more than 15 minutes, call the emergency medical services phone number below immediately. (Often this is 9-1-1, but you should check to make sure.) Never wait longer than 15 minutes.

At home, the emergency phone number is: _____

At work, the emergency phone number is: _____

At _____, the emergency phone number is:

_____



5. Know the location of the nearest 24-hour emergency department.

At home, the closest emergency department is: _____

At work, the closest emergency department is: _____

At _____, the closest emergency department is:

_____

Place this form next to the phone, near your other emergency numbers!

Signed: _____M.D./ R.N.

be recorded in the patient's medical record so it can be reinforced by other health care providers in the setting.

The second component of the message relates to the *emotional issues* surrounding the AMI experience that may contribute to delay behaviors. Recent research suggests a significant amount of delay is related to patients' beliefs that the symptoms are not serious and attributing them to a noncardiac cause.[50,68,77,81] It is quite natural to reduce anxiety about cardiac symptoms by searching for a cause less threatening than AMI. Patients and their families need assistance in anticipating this defense and recognizing that denial of the serious nature of symptoms contributes to treatment delay.

The provider also needs to ascertain whether the patient/family members/significant others have had prior negative experiences related to seeking care for a potential acute health problem, especially if it was cardiac in nature. If so, this should be noted and addressed.

To balance the aversive nature of the educational message, patients should be told about the efficacy of pharmacologic thrombolysis and other interventions for AMI. The reward of acting quickly and getting definitive treatment before irreversible myocardial damage occurs must be underscored. Positive messages about the salvage of cardiac muscle and survival when treatment begins rapidly are potentially more effective than negative messages about delay and the possibility of sudden death.

The third component of the message involves *social factors* surrounding the decision to seek treatment. The majority of patients consult a family member/significant other about their symptoms.[35,50] Family members/significant others should be included in all education and counseling and have a good understanding of the nature of AMI symptoms and the importance of calling EMS quickly. If interested, family members/significant others can be referred to an appropriate class on cardiopulmonary resuscitation where much of this information will be reinforced. They should be advised that patients will typically want to ascribe their symptoms to a noncardiac cause and that bystanders must take responsibility for calling EMS.

When and Where To Educate

The main arena for teaching should be the practitioner's office. Education and counseling should also occur during a patient's hospitalization for CHD, including reiterating the message with discharge instructions, and then further reinforcing the educational message in the outpatient setting and in other health care settings (e.g., by the cardiac rehabilitation nurse or the community pharmacist). Clearly, no single intervention, no matter how carefully designed, will be sufficient. Counseling needs to occur repetitively throughout the high-risk patient's course of treatment. The key to achieving behavioral change is to deliver a simple, consistent message repeatedly in a variety of settings.[22,82] This process not only increases knowledge—it can also effectively change behavior.

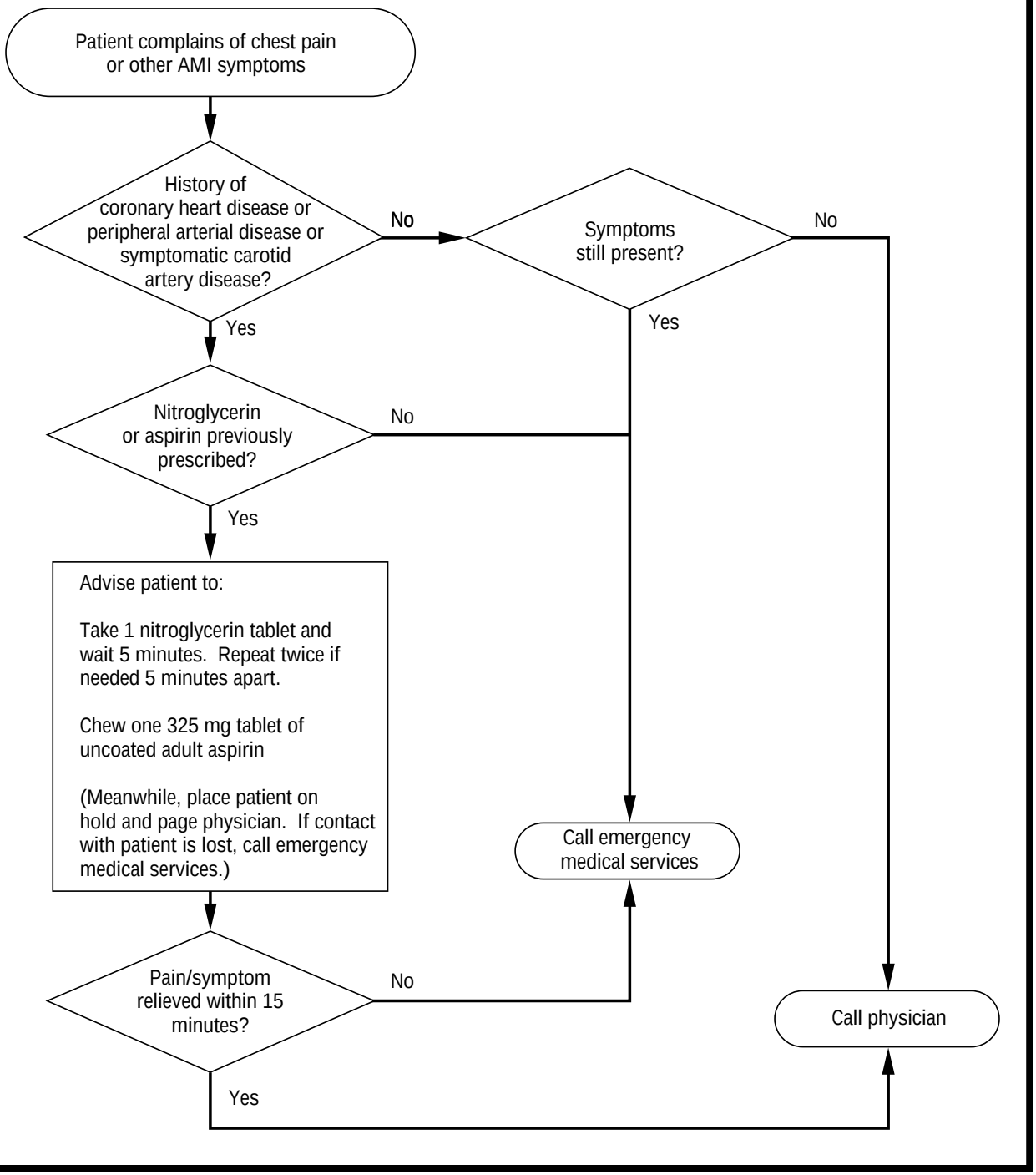
How: Educational Techniques for Conveying the Message

One-on-one instruction is the basic mechanism for delivery of the educational message. All health care providers caring for the same patient should give the same message, and the physician may want to discuss/communicate the content of the message with allied care providers, to promote consistency. Physicians should elicit the counseling skills of nurses and other care providers to complement their advice to patients and families. All verbal instruction should be accompanied by written information that addresses symptom recognition, appropriate steps to take, the emergency telephone number (if this is not 9-1-1), and the location of the closest emergency department to the patient's home and work. Written material should be developed at a sixth-grade level to ensure the material is understood.[83] In addition to the Patient Advisory Form (Figure 1), pamphlets and wallet cards on this topic are available from the American Heart Association.

Figure 2

OFFICE TELEPHONE TRIAGE ALGORITHM

FOR OFFICE STAFF TO USE IN ANSWERING TELEPHONE CALLS FROM PATIENTS WHO ARE HAVING CHEST PAIN OR OTHER SYMPTOMS OF ACUTE MYOCARDIAL INFARCTION.



One strategy to deal with the anticipated denial patients experience as part of the emotional response is rehearsal. Since symptoms can increase anxiety, patients should be encouraged to rehearse their response to a possible AMI at less stressful times so that the reaction becomes automatic.[84-86] Just as individuals practice disaster drills in the work setting or rehearse actions in case of a home fire, reviewing feelings and optimal behaviors in response to AMI symptoms increases the likelihood the appropriate steps will be taken despite an intense emotional reaction.

Although video or interactive computer programs should never replace one-on-one instruction, supplementary means of delivering the educational message regarding symptoms and action steps can be effective reinforcement.[82] A video message may prove ideal for use in hospital-based education, particularly in the hospital-specific video networks supplying information and entertainment to patients. A series of very short messages could be interspersed with normal programming to give the patient repeated exposures to this message. Interactive computer programs geared to patients with CHD augment other educational strategies. Such programs can be used in the hospital as well as in outpatient clinics, physician offices, and patients' homes.

This instruction can be part of a comprehensive secondary prevention effort in patients with previously established CHD. Information about symptom recognition and appropriate action can also be combined with reassurance concerning prognosis and without raising the level of anxiety about each episode of chest discomfort.[87]

Office Triage System

Finally, all office staff members (particularly receptionists or others with whom the patient is likely to have initial contact) should understand and support the educational program discussed here. Practitioners should provide clear instructions and training to the staff about actions to take when a patient with possible acute cardiac symptoms calls or walks into the office seeking advice. Precious time must not be wasted while the staff member tries to contact a physician who is temporarily unavailable. Just as emergency department personnel have a responsibility to examine the barriers to rapid triage and treatment of AMI patients,[9] the physician (or policy-making committee in a managed care setting) must devise a triage system to quickly identify such patients and refer them to the EMS system. An algorithm for telephone triage may help guide staff members in identifying patients who need emergency referral (Figure 2). (Note: These same principles can be applied to walk-in patients if a physician is not available.) Also, a continuous quality improvement approach should be part of any office/clinic-based triage system whereby information is collected about the explicit triage and referral processes (e.g., using a log sheet for calls about chest pain). These data are then reviewed on a regular basis, modifications to the procedures are made when the data so indicate, and the system is again reevaluated.

Economic, Legal, and Other Issues

The NHAAP is designed to educate patients to seek immediate emergency medical care when experiencing symptoms suggestive of AMI or ischemia. This program was launched in 1991; its efforts to educate health professionals, patients, and eventually the public about early recognition of and response to symptoms and signs of an AMI and acute ischemia are occurring at a time when the medical care system in the United States is undergoing tumultuous change designed to reduce the use of expensive and technically advanced medical care in favor of primary care and prevention. At the same time, the changing manner in which health care is being delivered and reimbursed is evolving toward the dominance of large HMOs and managed care organizations that control cost, in part, by closely monitoring and controlling access to care.

An important aspect of these cost-containment programs is reduction in the use of emergency

departments for the management of nonemergency illnesses, as noted previously. Specific guidelines need to be developed to protect the unencumbered access of patients at risk for AMI to emergency evaluation and care without the threat of nonpayment from their insurance carrier or health plan when it is determined they do not have myocardial ischemia or infarction. If this cannot be accomplished throughout the country, the threat to patients of large emergency department bills not paid by insurance is likely to limit the effectiveness of any educational effort directed toward reducing delay to treatment and improving care for patients with acute cardiac ischemia.

By directing educational efforts initially toward patients with cardiovascular disease, the number of unnecessary emergency department visits will likely be limited. However, any broad-based community educational program undertaken to educate individuals with symptoms of AMI to seek early medical care will increase the number of patients in emergency departments who have noncardiac chest pain,[88-90] although the size of this increase will depend on the specific message of the program. Research is currently under way to examine the effectiveness of public education and community intervention strategies in reducing AMI delay.[91] The systematic evaluation of new triage strategies, which may help avoid costly admissions to coronary care units to rule out AMI, should be encouraged. Tests identifying myocardial necrosis earlier in the course of infarction are currently being developed and may reduce the time patients need to be kept under medical observation.[92-94] It should also be noted that patients with a known history of CHD presenting to the emergency department with chest pain and who are discharged from the emergency department have a subsequent cardiovascular disease mortality similar to that of patients discharged following hospitalization for angina or MI.[95] Therefore, risk stratification needs to be done in these individuals at the time of evaluation in the emergency department or subsequently. Finally, patients with a history of cardiovascular disease who present to the emergency department with chest pain and are discharged from the emergency department should be given a clear recommendation to follow up with their personal physician about the episode.

As noted, minority populations of the inner city have long delays between symptom onset and time of arrival at the emergency department.[36,39] Many of these patients have no regular physician and, if they are followed at all, receive care in hospital clinics and neighborhood family care centers. Therefore, consideration should be given to counseling high-risk patients in these settings about symptom recognition and appropriate response, and to using simple messages and appropriate education tools. Clinics and neighborhood family care centers should also have appropriate triage systems.

Summary and Recommendations

Patients who receive medical attention early in the course of AMI have a reduced mortality compared with those treated later.[1,3,4,8,21] Since much of the emphasis on the management of AMI has centered on the use of thrombolytic therapy, there has been less discussion about the importance of other aspects of early care. The successful management of potentially fatal arrhythmias, including sustained ventricular tachycardia and ventricular fibrillation, and the care of patients with cardiogenic shock are both dependent on early and comprehensive treatment.[9,55] These serious arrhythmias are often readily managed when they develop in a patient who is monitored in the ambulance, emergency department, or coronary care unit, whereas the same arrhythmias are often fatal when they occur before the patient obtains medical care. Accessing the EMS system provides earlier availability of a defibrillator, should one be needed, because there has been a national effort to encourage equipping of all first-responding EMS vehicles with an automated external defibrillator.[57] The early use of other forms of therapy, including aspirin,[3] beta blockers, emergency coronary artery angioplasty,

myocardial revascularization surgery, and the intra-aortic balloon pump, are often life saving in patients with AMI.[21,55,96-99]

Thus, early management is important for all patients with AMI, not just for those who will receive thrombolytic therapy. Early medical therapy can be expected to reduce the morbidity and mortality of AMI, as compared with treatment initiated later in the course of the acute disease. In the short term, the reduction in infarct size as a result of early therapy will reduce the length and complexity of the remaining hospital course. Over the long term, this reduced morbidity will result in more individuals returning to active and productive lives.

Physicians and other health care providers play an important role in reducing the delay to evaluation and treatment. Patients with preexisting cardiovascular disease—CHD, atherosclerotic disease of the aorta or peripheral arteries, or carotid artery disease—are at high risk for a future AMI. This high-risk group needs to be told clearly what symptoms they might experience during a coronary occlusion, what steps to take, and to call EMS. They should be told about the importance of getting to an appropriate facility quickly, the treatment options available when presenting early, and the rewards of early treatment in terms of improved quality of life. These instructions need to be reviewed frequently and reinforced with appropriate written material and wallet cards (see Table 3).

No single intervention, no matter how carefully designed and implemented, will be sufficient to alter the individual's propensity to delay. A consistent message, delivered regularly, is needed to ensure increased knowledge and appropriate behavioral change. Impediments to early treatment should be identified and, when possible, modified with an appropriate action plan. Family members/significant others should be included in all instruction since they play an important role in increasing or decreasing the time to treatment.

Further research is required to identify the social and cognitive factors influencing patients' decisions to seek treatment in the context of an evolving coronary occlusion, especially those with prior CHD or other atherosclerotic disease. More research is needed to better understand AMI symptom expression in those with previously established atherosclerotic disease, including expression as modified by gender, ethnicity/race, age, and comorbid conditions (e.g., diabetes). Cultural interpretation and expression of symptoms in high-risk patients and the general population need to be studied as well. Research is also needed on accurate identification of high-risk subgroups and documentation of the efficacy of recommended interventions. Controlled trials must be conducted to determine the most effective strategies for altering patient/family/bystander behaviors contributing to treatment delay. Finally, barriers to rapid treatment within our current health care system must be identified, eliminated, and replaced with more effective and responsive systems to enhance access to timely care.

Table 3

HIGH-RISK PATIENT ACTION PLAN: SUMMARY FOR PRIMARY CARE PROVIDERS

I. WHO

A. High-risk patients are those with diagnosed CHD; also patients with clinical atherosclerotic disease of the aorta, arteries to the limbs, or carotid arteries. (This includes patients with previous MI or angina; patients who have had coronary angioplasty or coronary artery bypass surgery. Also consider at high risk patients with clinical symptoms and signs of peripheral vascular disease, or patients with transient ischemic attacks or stroke or demonstrated carotid atherosclerosis.)

B. Keep in mind those who have been shown to be likely to delay: the elderly, women, minorities, those with low socioeconomic status, as well as those with a history of angina/CHD, diabetes, and heart failure.

II. WHAT TO DISCUSS

A. Information about:

1. Typical symptoms of an AMI
   a. Chest discomfort/pain, possibly radiating to the arm, neck, or jaw
   b. Shortness of breath
   c. Sweating
   d. Gastrointestinal complaints (nausea)
2. Expectations about symptoms
   a. Symptoms may come on gradually or may be intermittent
   b. A heart attack is not necessarily accompanied by sudden, crushing chest pain and unconsciousness
   c. Patient's symptoms may or may not resemble prior symptoms
3. Action steps to take if experiencing symptoms
   a. Take appropriate medications:
      - Nitroglycerin (if prescribed)
      - Aspirin (chew one 325 mg adult uncoated tablet)
   b. Access EMS by calling emergency telephone number (9-1-1 or seven-digit emergency number) if the symptoms continue for more than 15 minutes
   c. Know the location of the hospital with 24-hour emergency department service closest to the patient's home or work
4. Identify the potential health care system barriers that exist for the patient and personalize the information accordingly

B. Emotional aspects:

1. There is a big reward for acting quickly and getting definitive treatment before irreversible myocardial damage occurs
2. Denial of the serious nature of symptoms contributes to treatment delay
3. Attribution of symptoms to a system other than cardiac is common, but contributes to delay
4. Prior negative experiences in seeking care need to be reconciled

C. Social aspects:

1. Family members/significant others should be included in all education and counseling and have a good understanding of the nature of AMI symptoms and the importance of calling EMS quickly
2. Family members/significant others should consider taking a CPR class
3. Family members/significant others have an important role in preventing patient denial and in facilitating the call to access EMS

III. WHEN AND WHERE (TO EDUCATE)

A. Office/clinic visits
B. Inpatient setting and at discharge
C. Cardiac rehabilitation programs
D. Community (e.g., home health nurse, pharmacist)

IV HOW

A. Consider that one-on-one instruction is important
   1. Keep message simple and consistent
   2. Repeat message in a variety of settings
   3. Elicit counseling skills of nurses and other health care providers
B. Use supplementary means of reinforcing the educational message about symptoms and action steps
   1. Written materials (at approximately sixth-grade reading level)
   2. Patient advisory form
   3. Video
   4. Interactive computer programs
C. Encourage patients to have a plan and to review/rehearse it periodically (Figure 1)
D. Devise a system in office/clinic to triage and treat patients rapidly who may have an evolving AMI (e.g., algorithm—Figure 2)
E. Office/clinic staff should understand and support triage system developed to handle patient calls/walk-ins with chest pain

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